

Figure 2a
Novel Compositions with Improved Chitinase Activity
Muller, et al.
Serial No. 10/692,367
Atty Docket No. 2119-4280
REPLACEMENT SHEET

	*	20	*	40	*
ChitinaseA :	-----CAGAACTGCGGCTGCCAGCAAACCTCTGCTGCAGCAAGTCGG				: 44
r1B6 :	TCGATG.....				: 50
r1B10 :	TCGATG.....	GC.T.GGG.C.G.....	CG.....		: 50
r1D4 :	TCGATG.....	G..G.A.....	T..		: 50
r2A2 :	TCGACG.....	GC.T.GGG.C.G.....	CG.....		: 50
r2C2 :	TCGATG.....	G.A.....	T..		: 50
r2E1 :	TCGATG.....	GC.T.GGG.C.G.....	CG.....		: 50
r2H2 :	TCGATG.....	G.A.....			: 50

	60	*	80	*	100
ChitinaseA :	CTACTGCGGCACGACCGACGCCACTGCGCGACGGGTGCCAGTCGGGCC				: 94
r1B6 :	.....AG.....				: 100
r1B10 :	.....				: 100
r1D4 :	.....AG.....				: 100
r2A2 :	.....				: 100
r2C2 :	.....AG.....				: 100
r2E1 :	.....				: 100
r2H2 :	.....AG.....	A....			: 100

	*	120	*	140	*
ChitinaseA :	CGTGCCGCTCGGGCGGC GGCGCGCGCGCGCGCGAGGC GGCGGA				: 144
r1B6 :	.....				: 150
r1B10 :	.....A..A.T.....T..T.-----				: 142
r1D4 :	.....				: 150
r2A2 :	.....A..A.T.....T..T.-----				: 142
r2C2 :	.....T.....				: 150
r2E1 :	.....A..A.T.....T..T.-----				: 142
r2H2 :	.....T.....				: 150

	160	*	180	*	200
ChitinaseA :	GGCAGTGGCGGTGCGAACGTGGCTAATGTGGTCACCGACGCGTTCTCAA				: 194
r1B6 :	.....A.....				: 200
r1B10 :	-----GC..C.....G.T.C.....				: 179
r1D4 :	.....GC..C.....G.T.C.....				: 200
r2A2 :	-----GC..C.....G.T.C.....				: 179
r2C2 :	.....				: 200
r2E1 :	-----GC..C.....G.T.C.....				: 179
r2H2 :G.....GC..C.....G.T.C.....				: 200

Figure 2b
Novel Compositions with Improved Chitinase Activity
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	* 220 *	240 *	
ChitinaseA :	CGGCATCAAGAACCAAGGCCGGGAGCGGGTGCAGGGCAAGAACTTCTACA	:	244
r1B6 :	.....G.....	:	250
r1B10 :	.....G.....	:	229
r1D4 :	.....G.....	:	250
r2A2 :	.....G.....T.....	:	229
r2C2 :	.....	:	250
r2E1 :	.....G.....	:	229
r2H2 :	.....G.....	:	250

	260 *	280 *	300	
ChitinaseA :	CCCGGAGCGCGTTCCTGAGCGCCGTCAACCGTACCCGGCTTCGCCAT	:	294	
r1B6 :	.....G.....A.....	:	300
r1B10 :	.....G.....A.....	:	279
r1D4 :	.....	:	300
r2A2 :	.....G.....A.....	:	279
r2C2 :	.....CGAG...A..GC.....G....	:	300
r2E1 :	.....G.....A.....	:	279
r2H2 :	.....G.....A.....	:	300

	* 320 *	340 *	
ChitinaseA :	GGCGGGACGGAGGTGGAGGGCAAGCGCGAGATCGCCGCCTTCTCGCGCA	:	344
r1B6 :	.....T.C.....C.....	:	350
r1B10 :	.....T.....	:	329
r1D4 :	.....	:	350
r2A2 :	.....T.....	:	329
r2C2 :	.....CT.C.....C...C.....T.....	:	350
r2E1 :	.....T.....	:	329
r2H2 :	.....T.....	:	350

	360 *	380 *	400	
ChitinaseA :	CGTCACGCACGAGACCGGACATTCTGCTACATCAGCGAGATCAACAAG-	:	393	
r1B6 :	..C.....G.....A.....G..GG.C	:	400	
r1B10 :	.....G.....A.....G..GG.C	:	379
r1D4 :	..C.....G.....	:	399	
r2A2 :	.....G.....A.....G..GG.C	:	379
r2C2 :	..C.....G.....G.....-	:	399	
r2E1 :	.....G.....A.....G..GG.C	:	379
r2H2 :G.....A.....G..GG.C	:	400	

Figure 2c
Novel Compositions with Improved Chitinase Activity
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	*	420	*	440	*
ChitinaseA :	--AGCAACGCCTACTGCGACGCGAGCAACAGGCAGTGGCCGTGCGCGGCG :	441			
r1B6 :	CG.....GAA.....CG..A.....C.....CA.... :	450			
r1B10 :	CG.....GAA.....CG..A.....C.....CA.... :	429			
r1D4 :	--..... :	447			
r2A2 :	CG.....GAA.....CG..A.....C.....CA.... :	429			
r2C2 :	--.....C...C...G.....C... :	447			
r2E1 :	CG.....GAA.....CG..A.....C.....CA.... :	429			
r2H2 :	CG.....GAA.....CG..A.....C.....CA.... :	450			
	460	*	480	*	500
ChitinaseA :	GGGCAGAAGTACTACGGGCGCGGCCGCTGCAGATCTCGTGGAACTACAA :	491			
r1B6 :	...A..GG.....C.....C.....T... :	500			
r1B10 :	...A..GG.....C.....C.....T... :	479			
r1D4 :	..... :	497			
r2A2 :	...A..GG.....C.....C.....T... :	479			
r2C2 :	..... :	497			
r2E1 :	...A..GG.....C.....C.....T... :	479			
r2H2 :	...A..GG.....C.....C.....T... :	500			
	*	520	*	540	*
ChitinaseA :	CTACGGGCCCGCCGGGAGGGACATCGGTTCAACGGCTCGCCGACCCC :	541			
r1B6 :	.....G.....C.....G.....GG.....G :	550			
r1B10 :	.....G.....C.....G.....GG.....G :	529			
r1D4 :	.....G..G.....AG.C.....G.....G.G.....G :	547			
r2A2 :	.....G.....C.....G.....GG.....G :	529			
r2C2 :	.....G.....C.....G.....GG.....G :	547			
r2E1 :	.....G.....C.....G.....GG.....G :	529			
r2H2 :	.....G.....C.....G.....GG.....G :	550			
	560	*	580	*	600
ChitinaseA :	ACAGGGTGGCGCAGGACGCCGTGATCGCGTTCAAGACGGCGCTCTGGTTC :	591			
r1B6 :	G.....G.....G.G.....G..... :	600			
r1B10 :	G.....G.....G.G.....G..... :	579			
r1D4 :	..GC.....GCAG.....C.....CGCT.C.....A. :	597			
r2A2 :	G.....G.....G.G.....G..... :	579			
r2C2 :	G.....G.....G.G.....G..... :	597			
r2E1 :	G.....G.....G.G.....G..... :	579			
r2H2 :	G.....G.....G.A.....G..... :	600			

Figure 2d
Novel Compositions with Improved Chitinase Activity
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	* 620 *	640	*
ChitinaseA :	TGGATGAACAAACGTGCACC GTGTGATGCCGCAGGGCTTCGGCGCCACCAT	:	641
r1B6 :	.....G.....G.G.....	:	650
r1B10 :	.....G...A.....AGC.C.....C.....G.....	:	629
r1D4 :	.....G.G...G.....G.....	:	647
r2A2 :	.....G...A.....AGC.C.....C.....G.....	:	629
r2C2 :	.....	:	647
r2E1 :	.....G...A.C....AGC.C.....C.....G.....	:	629
r2H2 :	.....G...A.....AGC.C.....C.....G.....	:	650

	660	* 680 *	700
ChitinaseA :	CAGGGCCATCAACGGCGCCCTCGAGTGCAACGGGAACAACCCGCCAGA	:	691
r1B6 :	:	700
r1B10 :	:	679
r1D4 :	:	697
r2A2 :	:	679
r2C2 :	:	697
r2E1 :	:	679
r2H2 :	:	700

	* 720 *	740	*
ChitinaseA :	TGAACGCGCGCGTGGCTACTACAAGCAGTACTGCCAGCAGCTCCGCGTC	:	741
r1B6 :	.....	:	750
r1B10 :	.....G.....GC.....G.....	:	729
r1D4 :	.....G.....GC.....G.....	:	747
r2A2 :	.....G.....GC.....G.....	:	729
r2C2 :	.....G.....GC.....G.....	:	747
r2E1 :	.....G.....GC.....G.....	:	729
r2H2 :	.....G.....GC.....G.....	:	750

	760	*	
ChitinaseA :	GACCCAGGGCCAACCTCACTTGC	:	765
r1B6 :	.....	:	774
r1B10 :	.....G..CAA.....C...:	:	753
r1D4 :C.....C...:	:	771
r2A2 :G..CAA.....C...:	:	753
r2C2 :G..CAA.....C...:	:	771
r2E1 :G..CAA.....C...:	:	753
r2H2 :G..CAA.....C...:	:	774

Figure 3a
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	*	20	*	40	*
ChitinaseA	:	--QNCGCQPNFCCSKFGYCGTTDAYCGDGCQSGPCRSGGGGGGGGGGGGG			: 48
r1B6	:	SM.....E.....			: 50
r1B10	:	SM....ASGL...R.....		SS...---	: 47
r1D4	:	SM.....V.....E.....			: 50
r2A2	:	ST....ASGL...R.....		SS...---	: 47
r2C2	:	SM.....V.....E.....			: 50
r2E1	:	SM....ASGL...R.....		SS...---	: 47
r2H2	:	SM.....V.....E.....			: 50

	60	*	80	*	100	
ChitinaseA :	GSGGANVANVVTDAFFNGIKNQAGSGCEGKNFYTRSAFLSAVNAYPGFAH					: 98
r1B6 :	.....S.....		K.....			: 100
r1B10 :	----..S...GS.....S.....		K.....			: 92
r1D4 :	.....S...GS.....S.....					: 100
r2A2 :	----..S...GS.....S.....		K.....			: 92
r2C2 :	.....		E. IA.....			: 100
r2E1 :	----..S...GS.....S.....		K.....			: 92
r2H2 :	.....S...GS.....S.....		K.....			: 100

	*	120	*	140	*
ChitinaseA	:	GGTEVEGKREIAAFFAHVTGHFCYISEINK-SNAYCDASNQWP	CAA	:	147
r1B6	:	..SQ.Q.....A.....	N..DGP.KN...RN.T....Q.	:	150
r1B10	:	..S.....	N..DGP.KN...RN.T....Q.	:	142
r1D4	:	.....A.....	--.....	:	148
r2A2	:	..S.....	N..DGP.KN...RN.T....Q.	:	142
r2C2	:	..S...R.....A.....	V.--.....PTK.....	:	148
r2E1	:	..S.....	N..DGP.KN...RN.T....Q.	:	142
r2H2	:	..S.....	N..DGP.KN...RN.T....Q.	:	150

	160	*	180	*	200	
ChitinaseA	GQKYYGRGPLQISWNWNYGPAGRDLIGFNGLADPNRVAQDAVIAFKTALWF					: 197
r1B6	: .KG..... F..... A...D..G..G...R...V...A....					: 200
r1B10	: .KG..... A...D..G..G...R...V...A....					: 192
r1D4	:SL..D..G..DA..RS..L..RS...Y					: 198
r2A2	: .KG..... A...D..G..G...R...V...A....					: 192
r2C2	:A...D..G..G...R...V...A....					: 198
r2E1	: .KG..... A...D..G..G...R...V...A....					: 192
r2H2	: .KG..... A...D..G..G...R...V...A....					: 200

Figure 3b
Novel Compositions with Improved Chitinase Activity
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	*	220	*	240	*
ChitinaseA :	WMNNVHRVMPQGFGATIRAINALECNGNNPAQMNRGVGYYKQYCQQLRV				: 247
r1B6 :	...S..G.....				: 250
r1B10 :	..K.M.QL.....			R...R..G.	: 242
r1D4 :	.....G.V.....T.....			R...R..G.	: 248
r2A2 :	..K.M.QL.....			R...R..G.	: 242
r2C2 :	.....			R...R..G.	: 248
r2E1 :	..K.I.QL.....			R...R..G.	: 242
r2H2 :	..K.M.QL.....			R...R..G.	: 250

ChitinaseA :	DPGPNLTC	: 255
r1B6 :	.....	: 258
r1B10 :	...N....	: 250
r1D4 :	.....	: 256
r2A2 :	...N....	: 250
r2C2 :	...N....	: 256
r2E1 :	...N....	: 250
r2H2 :	...N....	: 258

Figure 6a
Novel Compositions with Improved Chitinase Activity
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	*	20	*	40	*	
4M1/1_H2	:	TCGATGCAGAACTGCGGCTGCCAGCAAACGTATGCTGCAGCAAGTTGGCTACT	:	55		
4M1/11_C10	:	.....G...GC.T.GGG.C.G.....CG...C..G....	:	55		
4M1/26_C2	:	.....G...GC.T.GGG.C.G.....CG...C..G....	:	55		

	60	*	80	*	100	*	
4M1/1_H2	:	GCGGCACGACCGACGAGTACTGCGGCGACGGGTGCCAGTCGGGCCGTGCCGCTC	:	110			
4M1/11_C10	:	.....	:	110			
4M1/26_C2	:	....G...GG...G..C.....C.....	:	110			

	120	*	140	*	160	*	
4M1/1_H2	:	GGCGGGCGGCAGCAGTGGCGCGGGAGGCAGTCGGCGGTGCG	:	165			
4M1/11_C10	:	.....-----A..A.T.....T-----.....	:	144			
4M1/26_C2	:	.....-----.	:	156			

	*	180	*	200	*	220	*	
4M1/1_H2	:	AACGTGGCTAACGTGGTCACCGACGCCTTCAACGGCATCAAGAACCGAGGCCG	:	220				
4M1/11_C10	:	.....GC..C.....G.T.C.....G.....	:	199				
4M1/26_C2	:	.....	:	211				

	*	240	*	260	*		
4M1/1_H2	:	GGAGCTGGTGCAGGGCAAGAACTTCTACACCCGGAGCGCGTCTGAGCGCCGT	:	275			
4M1/11_C10	:	.....G.....	:	254			
4M1/26_C2	:	.....G.....	:	266			

	280	*	300	*	320	*	
4M1/1_H2	:	CAAGGCGTACCCAGGCTTCGCCATGGCGGGTCGCAGGTGCAGGGCAAGCGCGAG	:	330			
4M1/11_C10	:	.....	:	309			
4M1/26_C2	:	.....G.....C..CG....CG..C.....	:	321			

	340	*	360	*	380	*	
4M1/1_H2	:	ATCGCCGCCTTCTTCGCGCATGTCACGCACGAGACCAGGCATTGTGCTACATCA	:	385			
4M1/11_C10	:	.....C.C.....C.....	:	364			
4M1/26_C2	:	..T.....C.....	:	376			

	*	400	*	420	*	440	*	
4M1/1_H2	:	ACGAGGTCAACAAGAGCAACGCCTACTGCGACCCGACCAAGAGGCAGTGCGCGTG	:	440				
4M1/11_C10	:	G....A.....	:	419				
4M1/26_C2	:	G....A.....	:	431				

Figure 6b
Novel Compositions with Improved Chitinase Activity
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	* 460 *		* 480 *	
4M1/1_H2	: CGCCGCGGGGCAGAAGTACTACGGGCGCGGCCGCTGCAGATCTCGTGGAACTAC		: 495	
4M1/11_C10	:		: 474	
4M1/26_C2	:C.....C.....C.....		: 486	

	500 * 520 *		540 *	
4M1/1_H2	: AACTACGGGCCCGCGGGGAGGGCCATCGGCTTCGACGGCTGGGAGACCCGGACA		: 550	
4M1/11_C10	:C..G....C.G..		: 529	
4M1/26_C2	:		: 541	

	560 * 580 *		600	
4M1/1_H2	: GACTGGCGCAGGACCCGTGTTGTCGTTCAAGTCGGCGCTCTGGTTCTGGATGAA		: 605	
4M1/11_C10	: .GG.....G.....G..G.....G.....G.....		: 584	
4M1/26_C2	:G.....		: 596	

	* 620 *		640 *		660	
4M1/1_H2	: CAACGTGCACCGTGTGATGCCGCAGGGCTTCGGCGCACCATCAGGGCCATCAAC		: 660			
4M1/11_C10	:					: 639
4M1/26_C2	:					: 651

	* 680 *		700 *		*	
4M1/1_H2	: GGCGCCCTCGAGTGCGCGGGAACAAACCCGCCAGATGAACGCGCGTCGGCT		: 715			
4M1/11_C10	:G.....AA.....					: 694
4M1/26_C2	:AA.....					: 706

	720 * 740 *		760 *		*	
4M1/1_H2	: ACTACAGGCAGTACTGCCGCCAGCTCGGCGTCGACCCGGGAAACAACCTCACCTG		: 770			
4M1/11_C10	:A.....AG.....C.....A..GCC.....		: 749			
4M1/26_C2	:					: 761

4M1/1_H2	: C : 771
4M1/11_C10	: . : 750
4M1/26_C2	: . : 762

Figure 7
Novel Compositions with Improved Chitinase Activity
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* 20 * 40 *

4M1/1_H2	: SMQNCGCQPNVCCSKFGYCGTTDEYCGDGCQSGPCRSGGGSSGGGGGGSGGA	:	55	
4M1/11_C10	:ASG.....	-----SS-----	:	48
4M1/26_C2	:ASG.....GED...A.....	---.....	:	52

60 * 80 * 100 *

4M1/1_H2	: NVANVVTDAFFNGIKNQAGSWCEGKNFYTRSAFLSAVKAYPGFAHGGSQVQGKRE	:	110	
4M1/11_C10	: ...S...GS.....S....G.....	.....	:	103
4M1/26_C2	:G.....	R...	:	107

120 * 140 * 160

4M1/1_H2	: IAAFFAHVTTHEGHLCYINEVNKSNAycopTKRQWPCAAGQKYYGRGPLQISWNY	:	165	
4M1/11_C10	:A.....F...S.....	.....	:	158
4M1/26_C2	:F...S.....	.....	:	162

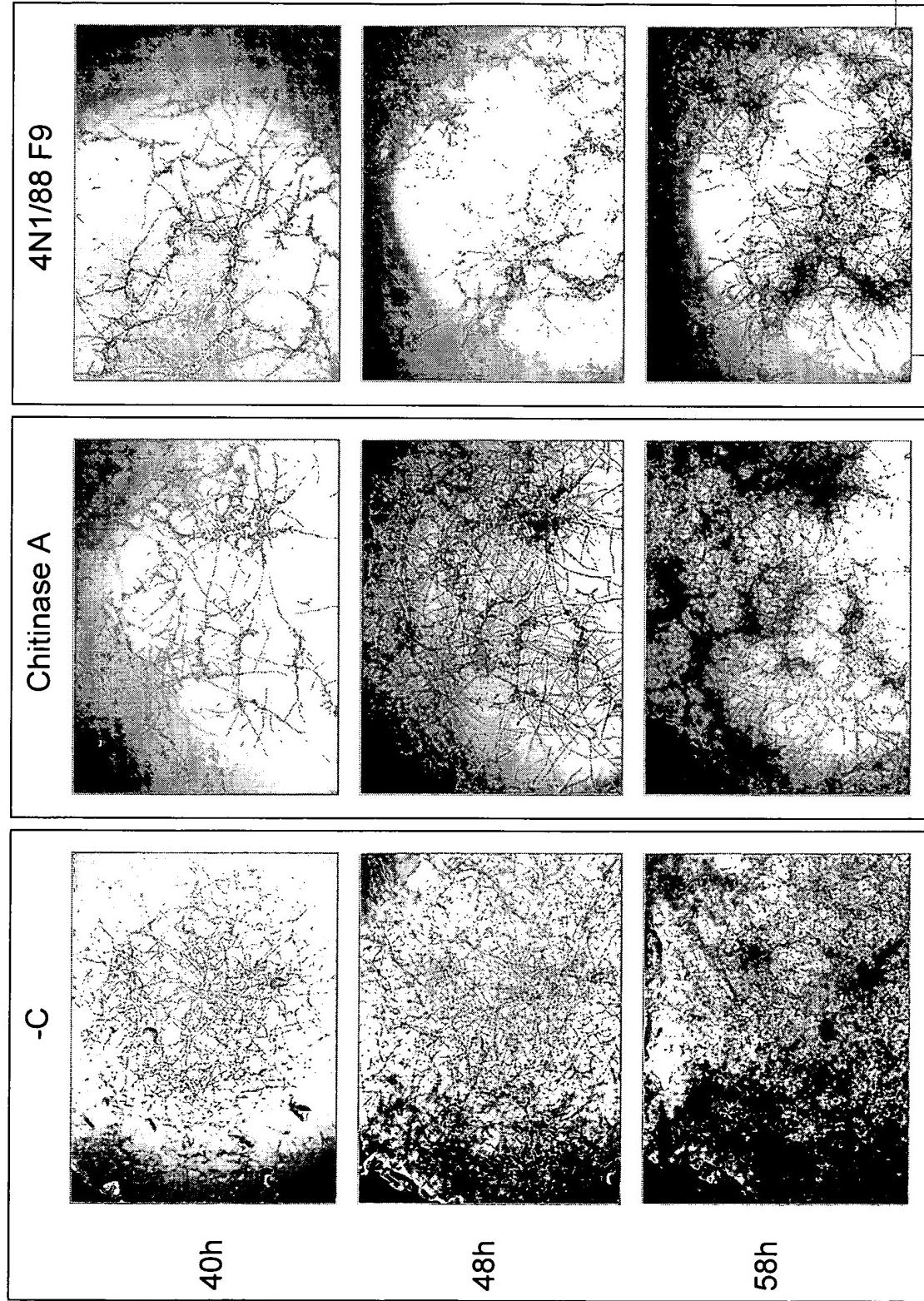
* 180 * 200 * 220

4M1/1_H2	: NYGPAGRAIGFDGLGDPDRLAQDPVLSFKSALWFWMNNVRVMPQGFGATIRAIN	:	220	
4M1/11_C10	:G...R.A..A..A.....	.....	:	213
4M1/26_C2	:A.....	.....	:	217

* 240 *

4M1/1_H2	: GALECGGNPDAQMNARVGYYRQYCRQLGVDPGNNLTC	:	257	
4M1/11_C10	:N.....Q..R....P....	:	250
4M1/26_C2	:N.....	:	254

Figure 8
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Figure 9
Novel Compositions with Improved Chitinase Activity
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Average of estimated IC₅₀ values

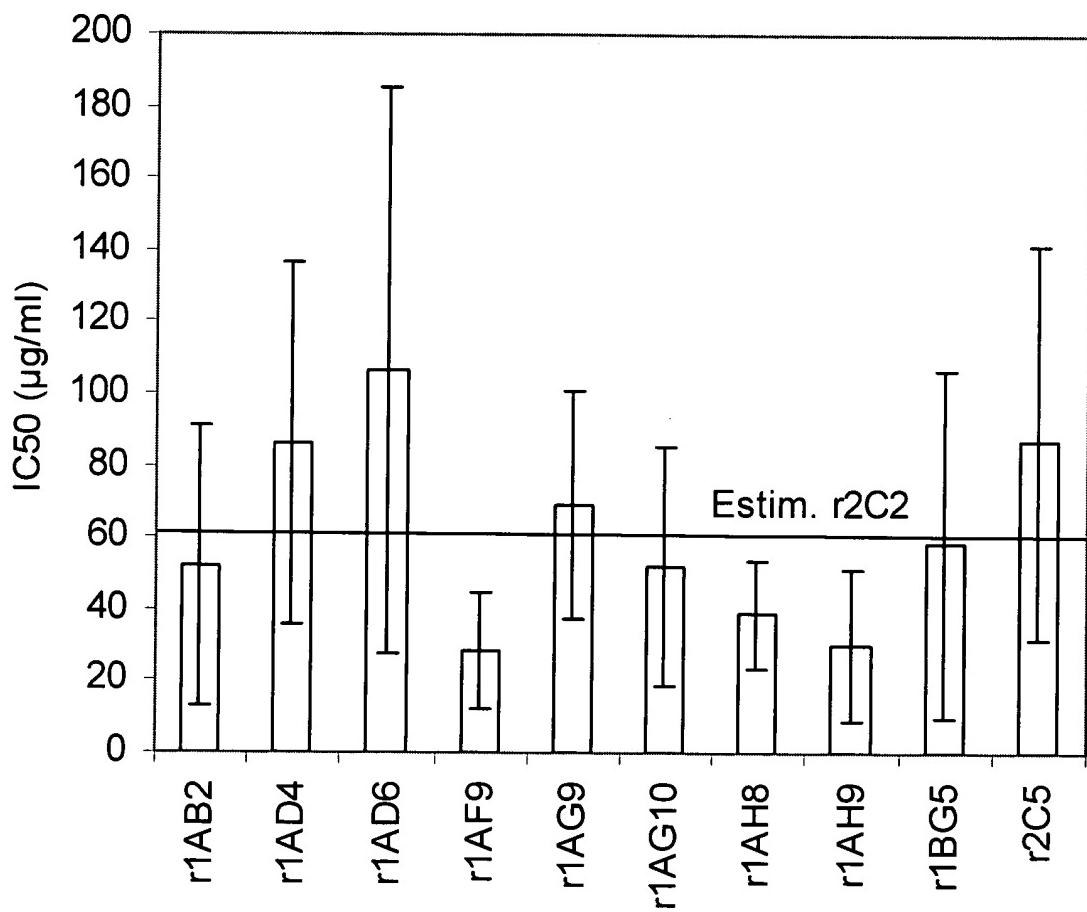


Figure 10
Novel Compositions with Improved Chitinase Activity
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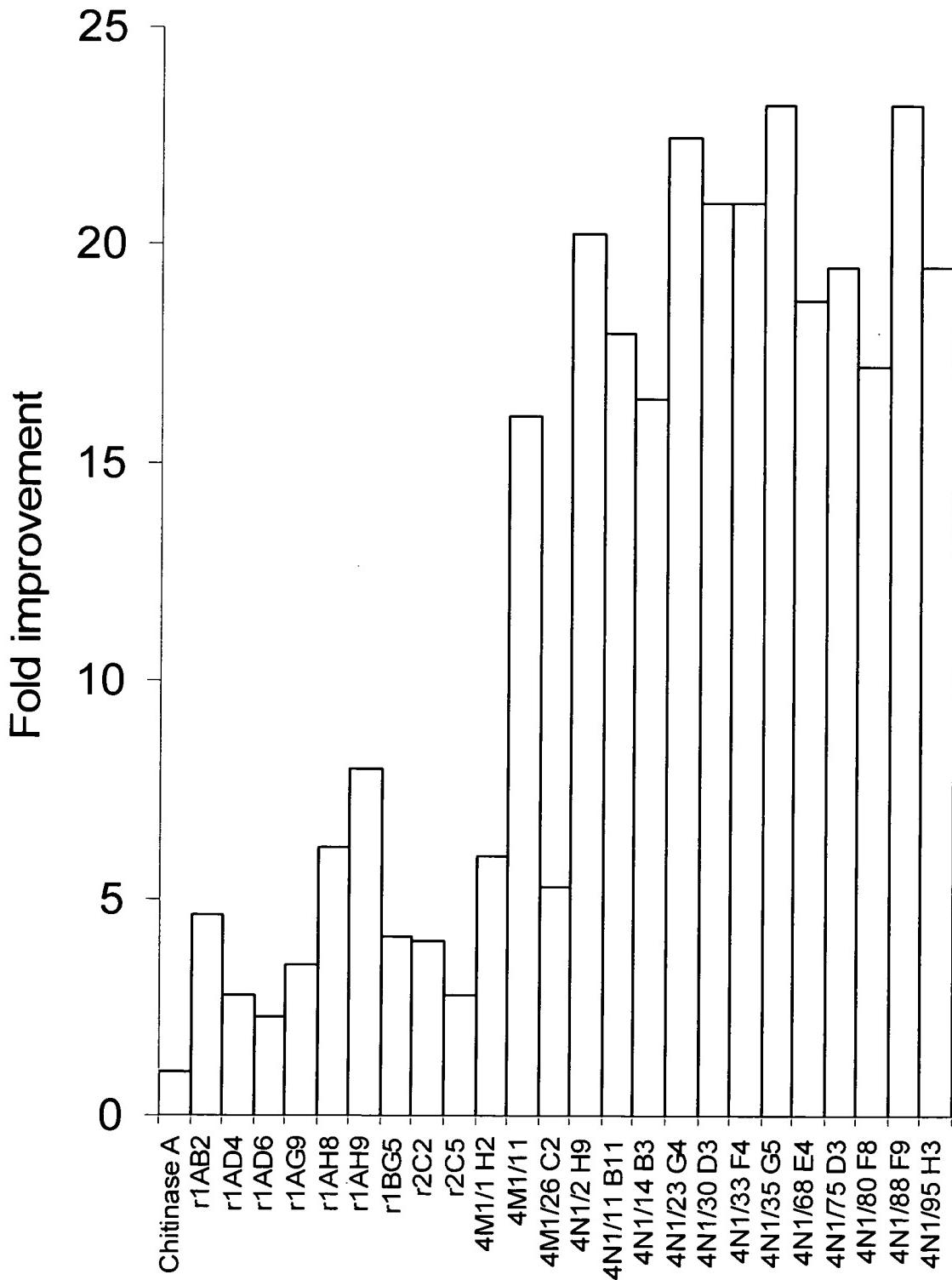


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	*	20	*	40	*
r1AB2	:	TCGATGCAGAACTGCGGCTGCCAGCCAAACTTCTGCTGCAGCAAGTTCGGCTACT	:	55	
r1AD4	:	.....G.A.....T.....	:	55	
r1AD6	:	.....T.....	:	55	
r1AG9	:	.....G.A.....T.....	:	55	
r1AH8	:	.....	:	55	
r1AH9	:	.....G.A.....T.....	:	55	
r1BG5	:	.....G.A.....	:	55	
r2C5	:	.....G...GC.T.GGG.A.G.....CG.....	:	55	
4N1/95_H3	:	.....G.A.....T.....	:	55	
4N1/80_F8	:	.....G.A.....CG.....	:	55	
4N1/75_D3	:	.....G.A.....	:	55	
4N1/2_H9	:	.....G.A.....T.....	:	55	
4N1/23_G4	:	.....G.A.....T.....	:	55	
4N1/68_E4	:	.....G.A.....T.....	:	55	
4N1/88_F9	:	.....G.A.....T.....	:	55	
4N1/14_B3	:	.....T.....G.A.....	:	55	
4N1/33_F4	:	.....T.....	:	55	
4N1/11_B11	:	.....G.A.....	:	55	
4N1/30_D3	:	.....	:	55	
4N1/35_G5	:	.....G.A.....T.....	:	55	

	60	*	80	*	100	*
r1AB2	:	GCGGCACGACCGACGCCCTACTGCGGCGACGGGTGCCAGTCGGGCCGTGCCGCTC	:	110		
r1AD4	:	.....AG.....	:	110		
r1AD6	:	.....AG.....C.....	:	110		
r1AG9	:	.....A.....AG.....	:	110		
r1AH8	:	.....AG.....	:	110		
r1AH9	:	.....AG.....C.....	:	110		
r1BG5	:	.....AG.....A....	:	110		
r2C5	:	.....AG.....	:	110		
4N1/95_H3	:	.....AG.....	:	110		
4N1/80_F8	:	.....AG.....G.....	:	110		
4N1/75_D3	:	.....AG.....	:	110		
4N1/2_H9	:	.....AG.....	:	110		
4N1/23_G4	:	.....AG.....	:	110		
4N1/68_E4	:	.....AG.....C.....A....	:	110		
4N1/88_F9	:	.....A.....AG.....A....	:	110		
4N1/14_B3	:AG.....C.....	:	110		
4N1/33_F4	:	:	110		
4N1/11_B11	:AG.....C....	:	110		
4N1/30_D3	:A.....AG.....	:	110		
4N1/35_G5	:AG.....C....	:	110		

Figure 11b
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	120	*	140	*	160	
r1AB2	: GGGCGGCGGCAGCAGTGGCGCGGT-----					: 138
r1AD4	:T...G..G.C.....CGGAGGCAGG-----					: 159
r1AD6	:-----					: 138
r1AG9	:T...G..G.C.....CGGAGGCAGG-----					: 159
r1AH8	:-----					: 138
r1AH9	:G..G.C.....CGGAGGCAGG-----					: 159
r1BG5	:T.....GGCGGCGGCAGCGGCGGAGG-----					: 165
r2C5	:G..G.C.....AGGCAGG-----					: 156
4N1/95_H3	:GGT-----					: 141
4N1/80_F8	:T...G..G.C.....CGGAGGCAGG-----					: 159
4N1/75_D3	:G..G.C.....AGGCAGG-----					: 156
4N1/2_H9	:GGT-----					: 141
4N1/23_G4	:-----					: 138
4N1/68_E4	:-----					: 138
4N1/88_F9	:T...G..G.....-----					: 138
4N1/14_B3	:-----					: 138
4N1/33_F4	:T...G..G.....AGGCAGG-----					: 156
4N1/11_B11	:G.TG.C.....AGGCAGG-----					: 156
4N1/30_D3	:G..G.C.....CGGAGGCAGG-----					: 159
4N1/35_G5	: ...T.....T...G..G.C.....CGGAGGCAGG-----					: 159

	*	180	*	200	*	220	
r1AB2	: GGTGCGAACGTGGCTAGCGTCGTACCGGCTCCTTCAACGGCATCAAGAGCC						: 193
r1AD4	:AT..G.....A.G.G.....A..						: 214
r1AD6	:-----						: 193
r1AG9	:AT..G.....A.G.G.....A..						: 214
r1AH8	:T.....A.....-----						: 193
r1AH9	:AT..G.....A.G.G.....A..						: 214
r1BG5	:AT..G.....-----						: 220
r2C5	:-----G.....A..						: 211
4N1/95_H3	: ---.....AT..G.....A.G.G.....A..						: 193
4N1/80_F8	:AT..G.....A.G.G.....A..						: 214
4N1/75_D3	:-----A..						: 211
4N1/2_H9	: ---.T.....C..A..G.....A..						: 193
4N1/23_G4	:-----						: 193
4N1/68_E4	:-----A..						: 193
4N1/88_F9	:-----A..						: 193
4N1/14_B3	:-----A..						: 193
4N1/33_F4	:AT..G.....A.G.G.....A..						: 211
4N1/11_B11	:-----						: 211
4N1/30_D3	:AT..G.....A.G.G.....A..						: 214
4N1/35_G5	:-----A..						: 214

Figure 11c
Novel Compositions with Improved Chitinase Activity
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	* 240 *	260 *	
r1AB2	: AGGCCGGGAGCGGGTGCAGGGCAAGAACCTCTACACCCGGAGCGCGTTCTGAG	:	248
r1AD4	:	CGA	: 269
r1AD6	:		: 248
r1AG9	:	CGA	: 269
r1AH8	:		: 248
r1AH9	:	A	: 269
r1BG5	:		: 275
r2C5	:		: 266
4N1/95_H3	:		: 248
4N1/80_F8	:		: 269
4N1/75_D3	:		: 266
4N1/2_H9	:		: 248
4N1/23_G4	:		: 248
4N1/68_E4	:		: 248
4N1/88_F9	:		: 248
4N1/14_B3	:		: 248
4N1/33_F4	:		: 266
4N1/11_B11	:		: 266
4N1/30_D3	:		: 269
4N1/35_G5	:		: 269

	280 * 300 * 320 *		
r1AB2	: CGCCGTCAAGCGTACCCAGGCTTCGCCATGGCGGCTCCGAGGTCGAGCGCAAG	:	303
r1AD4	: G...A..GCC.....G.....G.....		: 324
r1AD6	:		: 303
r1AG9	: G...A..GCC.....G.....G.....		: 324
r1AH8	:C.....G.....GA.G.....G..G.....		: 303
r1AH9	:G..GC.....GC..G.....		: 324
r1BG5	:G..AC.....GC..G.....		: 330
r2C5	:GA.G.....G..G.....		: 321
4N1/95_H3	:		: 303
4N1/80_F8	:G..GC.....GC..G.....		: 324
4N1/75_D3	:G..AC.....GC..G.....		: 321
4N1/2_H9	:GA.G.....G..G.....		: 303
4N1/23_G4	:G..GC.....GC..G.....		: 303
4N1/68_E4	:G..GC.....GC..G.....		: 303
4N1/88_F9	:G..AC.....GC..G.....		: 303
4N1/14_B3	:C.....G.....GA.G.....G..G.....		: 303
4N1/33_F4	:G..AC.....GC..G.....		: 321
4N1/11_B11	:		: 321
4N1/30_D3	:G..AC.....GC..G.....		: 324
4N1/35_G5	:G..GC.....GC..G.....		: 324

Figure 11d
Novel Compositions with Improved Chitinase Activity
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	340	*	360	*	380	
r1AB2	: CGCGAGATTGCCGCCTTCTTCGCGATGTCACGCACGGAGACCGGGCATTTCTGCT					: 358
r1AD4	:	C.C				: 379
r1AD6	:	C.C	T			: 358
r1AG9	:	C.C				: 379
r1AH8	:	C.C				: 358
r1AH9	:	C.C				: 379
r1BG5	:	C				: 385
r2C5	:	C.CA				: 376
4N1/95_H3	:					: 358
4N1/80_F8	:	C.C				: 379
4N1/75_D3	:	C		C..		: 376
4N1/2_H9	:	C	T			: 358
4N1/23_G4	:	C				: 358
4N1/68_E4	:	C	T			: 358
4N1/88_F9	:	C				: 358
4N1/14_B3	:		C.C			: 358
4N1/33_F4	:					: 376
4N1/11_B11	:		C.C			: 376
4N1/30_D3	:	C.C				: 379
4N1/35_G5	:	C				: 379

	*	400	*	420	*	440	
r1AB2	: ACATCAGCGAGATCAACAAGAGCAACGCCACTGCGACCCGACCAAGAGGCAGTG						: 413
r1AD4	:	G					: 434
r1AD6	:						: 413
r1AG9	:	G					: 434
r1AH8	:	A					: 413
r1AH9	:						: 434
r1BG5	:						: 440
r2C5	:						: 431
4N1/95_H3	:						: 413
4N1/80_F8	:						: 434
4N1/75_D3	:	G					: 431
4N1/2_H9	:		G				: 413
4N1/23_G4	:						: 413
4N1/68_E4	:						: 413
4N1/88_F9	:						: 413
4N1/14_B3	:						: 413
4N1/33_F4	:						: 431
4N1/11_B11	:	A					: 431
4N1/30_D3	:						: 434
4N1/35_G5	:						: 434

Figure 11e
Novel Compositions with Improved Chitinase Activity
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	* 460 *	480	*
r1AB2	: GCCGTGCGCCGCGGGGCAGAAGTACTACGGCGCGGCCGCTGCAGATCTCGTGG		: 468
r1AD4	:		: 489
r1AD6	:		: 468
r1AG9	:		: 489
r1AH8	:		: 468
r1AH9	:		: 489
r1BG5	:		: 495
r2C5	:		: 486
4N1/95_H3	:		: 468
4N1/80_F8	:		: 489
4N1/75_D3	:		: 486
4N1/2_H9	:		: 468
4N1/23_G4	:		: 468
4N1/68_E4	:	C.G.	: 468
4N1/88_F9	:		: 468
4N1/14_B3	:		: 468
4N1/33_F4	:		: 486
4N1/11_B11	:		: 486
4N1/30_D3	:	C.G.	: 489
4N1/35_G5	:	T.	: 489

	500 *	520 *	540 *
r1AB2	: AACTACAAC TACGGGCCCGCGGGAGGGCCATCGGCTTCGACGGCTCGGGGACC		: 523
r1AD4	:		: 544
r1AD6	:	T.	: 523
r1AG9	:		: 544
r1AH8	:		: 523
r1AH9	:	C.....A.....A.....CC....	: 544
r1BG5	:		: 550
r2C5	:	C.....	: 541
4N1/95_H3	:		: 523
4N1/80_F8	:	T.....	: 544
4N1/75_D3	:	T.....	: 541
4N1/2_H9	:		: 523
4N1/23_G4	:		: 523
4N1/68_E4	:	C.....A.....A.....CC....	: 523
4N1/88_F9	:	A.....A.....CC....	: 523
4N1/14_B3	:	G.....	: 523
4N1/33_F4	:		: 541
4N1/11_B11	:	CC....	: 541
4N1/30_D3	:	C.....A.....A.....CC....	: 544
4N1/35_G5	:	CC....	: 544

Figure 11f
Novel Compositions with Improved Chitinase Activity
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	560	*	580	*	600	
r1AB2	: CCGGCAGGGTGGCGCGGGACGCCGTGGTGGCCTCAAGGCGGCCTCTGGTTCTG :					578
r1AD4	:					599
r1AD6	: A C C					578
r1AG9	:					599
r1AH8	:					578
r1AH9	: . . AA A					599
r1BG5	: A A . C T A					605
r2C5	:					596
4N1/95_H3	:					578
4N1/80_F8	: . . AA					599
4N1/75_D3	:					596
4N1/2_H9	: T					578
4N1/23_G4	:					578
4N1/68_E4	: . . AA A A . C T					578
4N1/88_F9	: . . AA A					578
4N1/14_B3	:					578
4N1/33_F4	:					596
4N1/11_B11	:					596
4N1/30_D3	: . . AA C C					599
4N1/35_G5	: . . AA A					599

	*	620	*	640	*	660	
r1AB2	: GATGAACAACTGTGCACCGTGTGATGCCGCAGGGCTTCGGCGCCACCATCAGGGCC :						633
r1AD4	:						654
r1AD6	: G G . G G						633
r1AG9	:						654
r1AH8	:						633
r1AH9	: G G . G G C						654
r1BG5	: G . G . . . A . . . AGC . C . . . C						660
r2C5	: G G . G C G						651
4N1/95_H3	:						633
4N1/80_F8	: G G . G G C						654
4N1/75_D3	:						651
4N1/2_H9	: G G . G GC G						633
4N1/23_G4	:						633
4N1/68_E4	:						633
4N1/88_F9	:						633
4N1/14_B3	:						C
4N1/33_F4	:						651
4N1/11_B11	:						651
4N1/30_D3	:						654
4N1/35_G5	:						654

Figure 11g
Novel Compositions with Improved Chitinase Activity
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	*	680	*	700	*
r1AB2	:	ATCAACGGCGCCCTCGAGTGCACGGCAAGAACCCAACTCCGTCAACAAACCGCG	:	688	
r1AD4	:	.....G...G..C.....GC.CAGA.G...GCG....	:	709	
r1AD6	:	.....A...G..C.....GC.CAGA.G...GCG....	:	688	
r1AG9	:	.....G...G..C.....GC.CAGA.G...GCG....	:	709	
r1AH8	:	.....A...G..C.....GC.CAGA.G...GCG....	:	688	
r1AH9	:	.....A...G..C.....GC.CAGA.G...GCG....	:	709	
r1BG5	:	.....G...G..C.....GC.CAGA.G...GCG....	:	715	
r2C5	:	.....G.....G..C.....GC.CAGA.G...GCG....	:	706	
4N1/95_H3	:	.....G...G..C.....GC.CAGA.G...GCG....	:	688	
4N1/80_F8	:	.....A...G..C.....GC.CAGA.G...GCG....	:	709	
4N1/75_D3	:	.....G...G..C.....GC.CAGA.G...GCG....	:	706	
4N1/2_H9	:	.....A.....G...G..C.....GC.CAGA.G...GCG....	:	688	
4N1/23_G4	:	.....G.....G..C.....GC.CAGA.G...GCG....	:	688	
4N1/68_E4	:	.....G...G..C.....GC.CAGA.G...GCG....	:	688	
4N1/88_F9	:	.....G...G..C.....GC.CAGA.G...GCG....A	:	688	
4N1/14_B3	:	.....	:	688	
4N1/33_F4	:	.....G...C.....GC.CAGA.G...GCG....	:	706	
4N1/11_B11	:	.....G.....G..C.....GC.CAGA.G...GCG....	:	706	
4N1/30_D3	:	.....A.....G..C.....GC.CAGA.GG..GCG....	:	709	
4N1/35_G5	:	.....G...G..C.....GC.CAGA.G...GCG....	:	709	

	720	*	740	*	760	*
r1AB2	:	TCGCCTACTACAAGCAGTTCTGCCAGGATTCTGGCGTCGACCCAGGGCCAACCT	:	743		
r1AD4	:	....G.....A.....GCC.GC.....	:	764		
r1AD6	:	....G.....	:	743		
r1AG9	:	....G.....A.....GCC.GC.....	:	764		
r1AH8	:	....G.....A.....C.GC..C..	:	743		
r1AH9	:	....G.....G.....A.....GCC.GC.....	:	764		
r1BG5	:	....G.....A.....CC.GC.....	:	770		
r2C5	:	....G.....A.....C.GC..C.....G..CAA..	:	761		
4N1/95_H3	:	....G.....A.....GCC.GC.....	:	743		
4N1/80_F8	:	....G.....A.....GCC.GC.....	:	764		
4N1/75_D3	:	....G.....G.....A.....GCC.GC.....	:	761		
4N1/2_H9	:	....G.....A.....CC.GC.....	:	743		
4N1/23_G4	:	....G.....G.....A.....GCC.GC.....	:	743		
4N1/68_E4	:	....G.....G.....A.....GCC.GC.....	:	743		
4N1/88_F9	:	....G.....A.....GCC.GC.....	:	743		
4N1/14_B3	:	....G.....G.....A.....GCC.GC.....	:	743		
4N1/33_F4	:	....G.....G.....A.....GCC.GC.....	:	761		
4N1/11_B11	:	....G.....A.....GCC.GC.....	:	761		
4N1/30_D3	:	....G.....A.....GCC.GC.....	:	764		
4N1/35_G5	:G.....A.....GCC.GC.....	:	764		

Figure 11h
Novel Compositions with Improved Chitinase Activity
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r1AB2	:	TACTTGC	:	750
r1AD4	:	C.....	:	771
r1AD6	:	C.....	:	750
r1AG9	:	C.....	:	771
r1AH8	:	C.....	:	750
r1AH9	:	C.....	:	771
r1BG5	:	C.....	:	777
r2C5	:	C.....	:	768
4N1/95_H3	:	C.....	:	750
4N1/80_F8	:	C.....	:	771
4N1/75_D3	:	C.....	:	768
4N1/2_H9	:	C.....	:	750
4N1/23_G4	:	C.....	:	750
4N1/68_E4	:	C.....	:	750
4N1/88_F9	:	C.....	:	750
4N1/14_B3	:	C.....	:	750
4N1/33_F4	:	C.....	:	768
4N1/11_B11	:	C.....	:	768
4N1/30_D3	:	C.....	:	771
4N1/35_G5	:	C.....	:	771

Figure 12a
Novel Compositions with Improved Chitinase Activity
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	*	20	*	40	*	
r1AB2	:	SMQNCGCQPNFCCSKFGYCGTTDAYCGDGCQSGPCRSGGGGSSGGG-----			:	46
r1AD4	:V.....E.....	GG...GGG--GGSG		:	53
r1AD6	:	.....E..A.....			:	46
r1AG9	:	.....V.....E.....	GG...GGG--GGSG		:	53
r1AH8	:	.....E.....			:	46
r1AH9	:	.....V.....E.....	P...GG...GGG--GGSG		:	53
r1BG5	:	.....V.....E.....	H...C...GGGSGGGSG		:	55
r2C5	:	ASGM.....E.....	GG...GG--GGSG		:	52
4N1/95_H3	:	.....V.....E.....	G-----		:	47
4N1/80_F8	:	.....V.....E.....R.....	GG...GGG--GGSG		:	53
4N1/75_D3	:	.....V.....E.....	GG...GG--GGSG		:	52
4N1/2_H9	:	.....V.....E.....	G-----		:	47
4N1/23_G4	:	.....V.....E.....			:	46
4N1/68_E4	:	.....V.....E..A.....H.....			:	46
4N1/88_F9	:	.....V.....E.....H.....	GG...-----		:	46
4N1/14_B3	:	.....V.....E..A.....			:	46
4N1/33_F4	:	GG...GG--GGSG		:	52
4N1/11_B11	:	.....V.....E.....	P...GG...GG--GGSG		:	52
4N1/30_D3	:	GG...GGG--GGSG		:	53
4N1/35_G5	:	.....V.....E.....	P...GG...GGG--GGSG		:	53

	60	*	80	*	100	*
r1AB2	:	GANVASVVTGSFFNGIKSQAGSGCEGKNFYTRSAFLSAVKAYPGFAHGGSEVERK			:	101
r1AD4	:	....N..DA.....N.....	E..A.....		:	108
r1AD6	:	.....N.....			:	101
r1AG9	:	....N..DA.....N.....	E..A.....		:	108
r1AH8	:	.V.....D.....	N.....G.		:	101
r1AH9	:	....N..DA.....N.....	R.....G.		:	108
r1BG5	:	....N.....N.....			:	110
r2C5	:	.....S..N.....			:	107
4N1/95_H3	:	-....N..DA.....N.....			:	101
4N1/80_F8	:	....N..DA.....N.....			:	108
4N1/75_D3	:	.....N.....			:	107
4N1/2_H9	:	-V.....N.....			:	101
4N1/23_G4	:			:	101
4N1/68_E4	:	.....N.....			:	101
4N1/88_F9	:	.....N.....			:	101
4N1/14_B3	:	.....N.....	N.....		:	101
4N1/33_F4	:N..DA.....N.....			:	107
4N1/11_B11	:			:	107
4N1/30_D3	:N..DA.....N.....			:	108
4N1/35_G5	:D.....N.....			:	108

Figure 12b
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	120	*	140	*	160	
r1AB2	: REIAAFFAHVTTHEGHFCYISEINKSNAYCDPTKRQWPCAAGQKYYGRGPLQISW					: 156
r1AD4	:A.....					: 163
r1AD6	:A.....					: 156
r1AG9	:A.....					: 163
r1AH8	:A.....N.					: 156
r1AH9	:A.....					: 163
r1BG5	:					: 165
r2C5	:L.....					: 162
4N1/95_H3	:					: 156
4N1/80_F8	:A.....					: 163
4N1/75_D3	:R.....					: 162
4N1/2_H9	:S.....					: 156
4N1/23_G4	:					: 156
4N1/68_E4	:					: 156
4N1/88_F9	:					: 156
4N1/14_B3	:A.....					: 156
4N1/33_F4	:					: 162
4N1/11_B11	:A.....N.					: 162
4N1/30_D3	:A.....					: 163
4N1/35_G5	:					: 163

	*	180	*	200	*	220	
r1AB2	: NYNYGPAGRAIGFDGLGDPGRVARDAVVAFAALKWFWMNNVHRVMPQGFGATIRA					: 211	
r1AD4	:					: 218	
r1AD6	:Q.P.....S..G.....					: 211	
r1AG9	:					: 218	
r1AH8	:					: 211	
r1AH9	:D.....A..N..Q.....S..G.....T..					: 218	
r1BG5	:Q.....S.....E..Q.....					: 220	
r2C5	:L.....S..G.....					: 217	
4N1/95_H3	:					: 211	
4N1/80_F8	:N.....S..G.....T..					: 218	
4N1/75_D3	:					: 217	
4N1/2_H9	:S..G.A.....					: 211	
4N1/23_G4	:					: 211	
4N1/68_E4	:D.....A..N..Q.....S.....					: 211	
4N1/88_F9	:D.....A..N..Q.....					: 211	
4N1/14_B3	:G.....					: 211	
4N1/33_F4	:					: 217	
4N1/11_B11	:A.....					: 217	
4N1/30_D3	:D.....A..N.....P.....					: 218	
4N1/35_G5	:A..N..Q.....					: 218	

Figure 12c
Novel Compositions with Improved Chitinase Activity
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	*	240	*
r1AB2	:	INGALECDGKNPNSVNNRVAYYKQFCQDFGVDPGPNLTC	: 250
r1AD4	:G.N..AQ..A..G.....RQL.....	: 257
r1AD6	:	.....N..AQ..A..G.....	: 250
r1AG9	:	.....G.N..AQ..A..G.....RQL.....	: 257
r1AH8	:	.....N..AQ..A..G.....QLR.....	: 250
r1AH9	:	.....N..AQ..A..G.....RQL.....	: 257
r1BG5	:	.....G.N..AQ..A..G.....HQL.....	: 259
r2C5	:	.....N..AQ..A..G.....QLR....N....	: 256
4N1/95_H3	:	.....G.N..AQ..A..G.....RQL.....	: 250
4N1/80_F8	:	.....N..AQ..A..G.....RQL.....	: 257
4N1/75_D3	:	.....G.N..AQ..A..G.....RQL.....	: 256
4N1/2_H9	:	.....G.N..AQ..A..G.....HQL.....	: 250
4N1/23_G4	:	.....G.N..AQ..A..G.....RQL.....	: 250
4N1/68_E4	:	.....G.N..AQ..A..G.....RQL.....	: 250
4N1/88_F9	:	.....G.N..AQ..A..G.....RQL.....	: 250
4N1/14_B3	:	.....RQL.....	: 250
4N1/33_F4	:	.....N..AQ..A..G.....RQL.....	: 256
4N1/11_B11	:	.....N..AQ..A..G.....RQL.....	: 256
4N1/30_D3	:	.....K.G.N..AQ..A..G.....RQL.....	: 257
4N1/35_G5	:G.N..AQ..A..G.....RQL.....	: 257

Figure 13
Novel Compositions with Improved Chitinase Activity
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Round 4 - Estimated IC₅₀ values

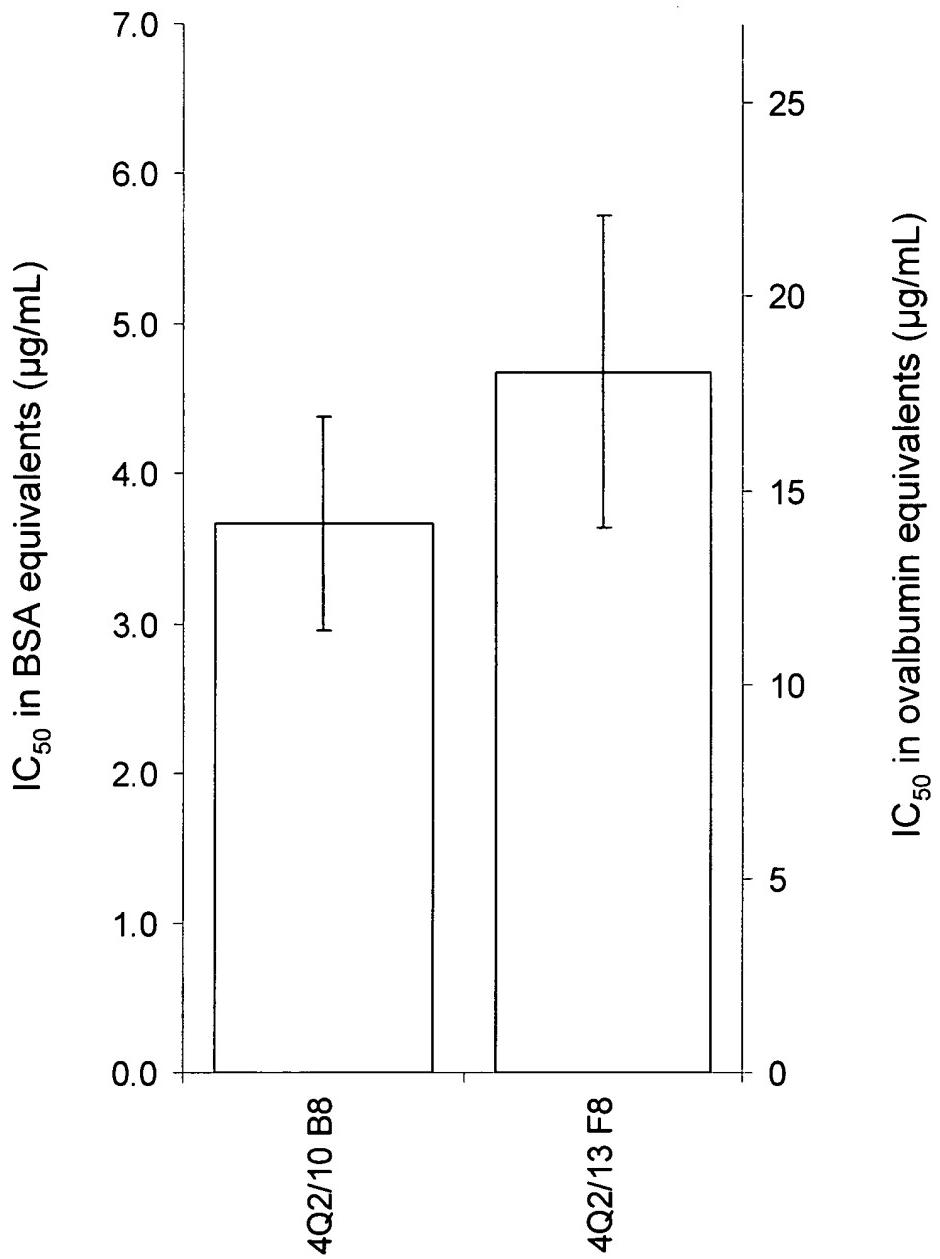


Figure 14
Novel Compositions with Improved Chitinase Activity
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Round 4 - Estimated IC₅₀ values

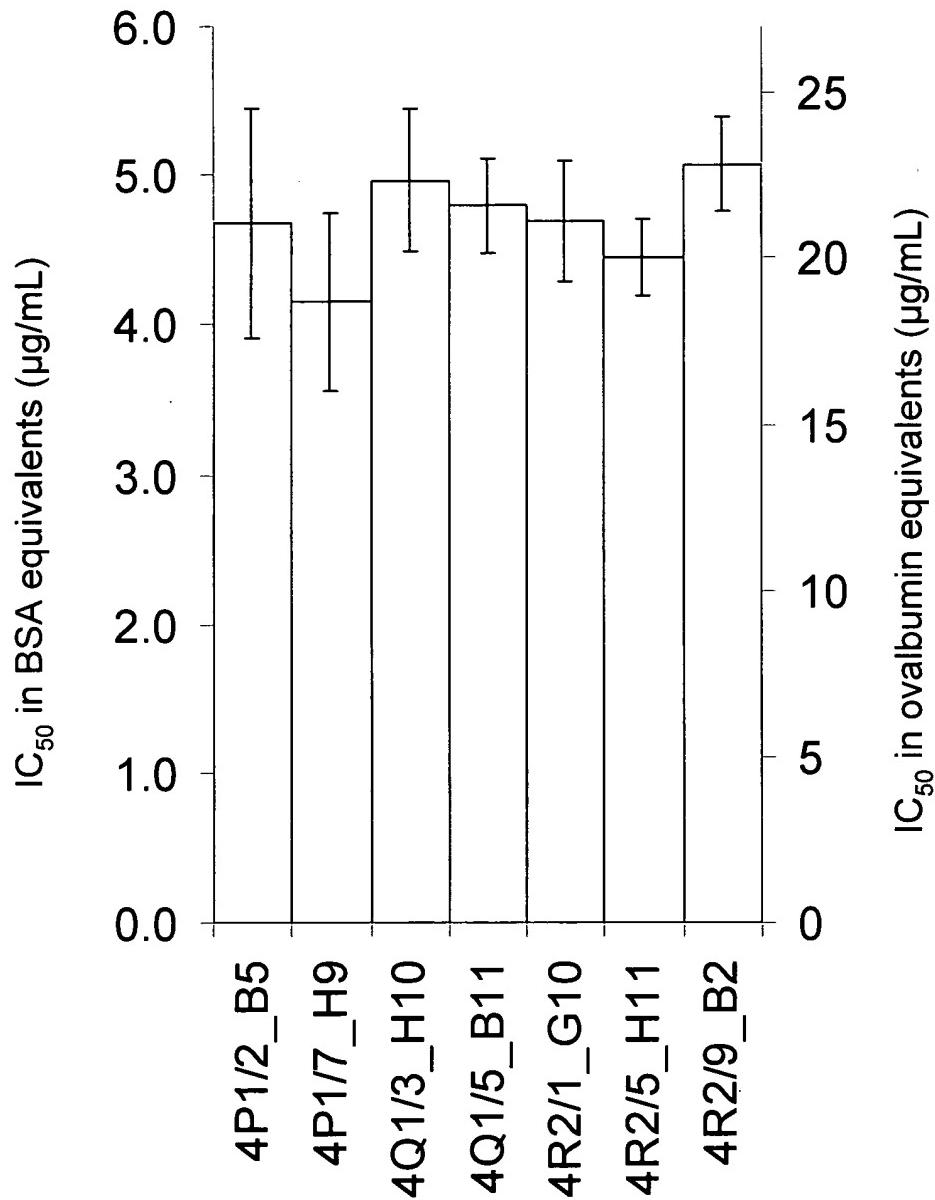


Figure 15
Novel Compositions with Improved Chitinase Activity
Muller, et al.
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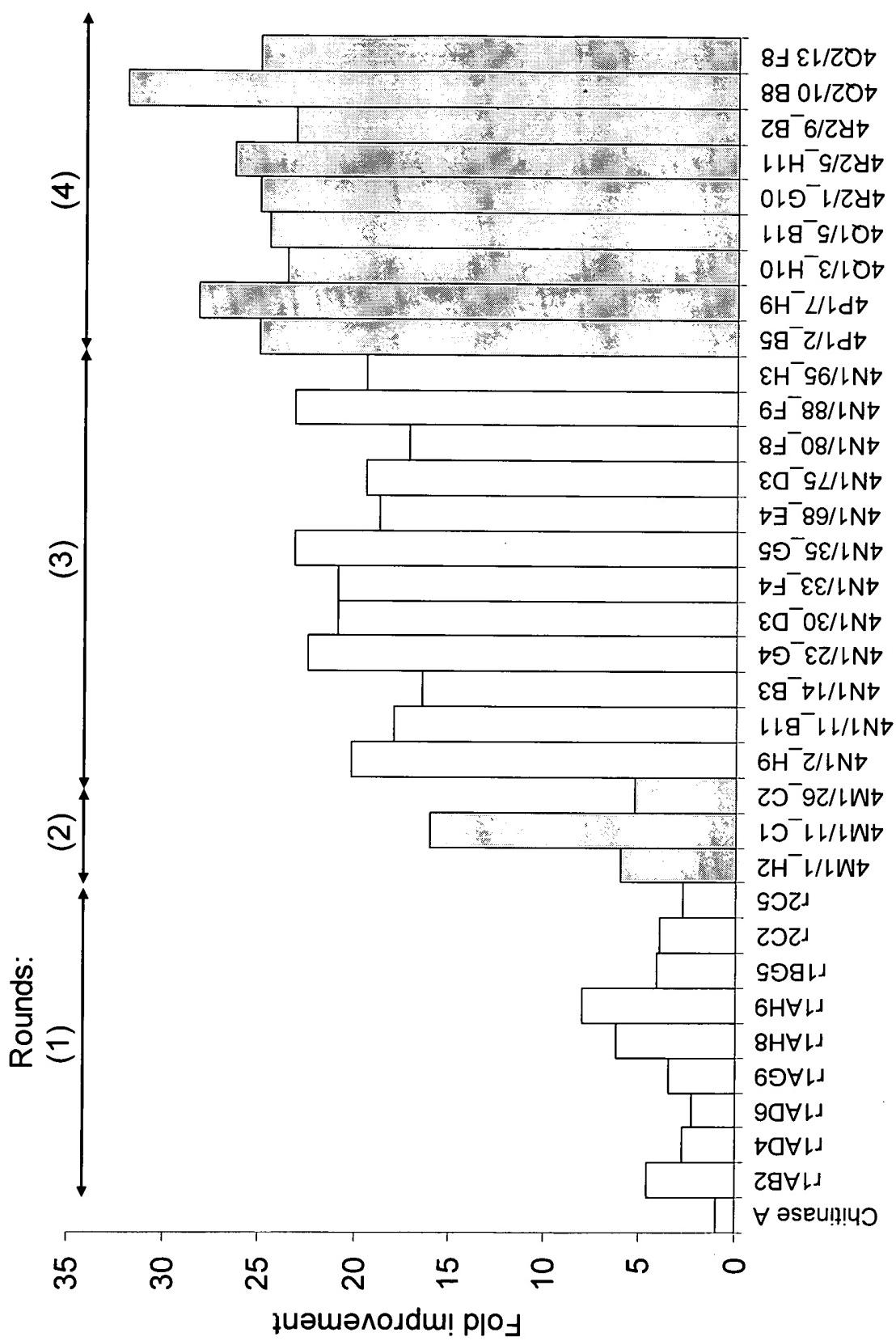


Figure 16a
Novel Compositions with Improved Chitinase Activity
Muller, et al.
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REPLACEMENT SHEET

	*	20	*	40	*	
4Q2/10_B8 :	TCGATGCAGAACTGCGCTGCCAGCCAAACGTATGCTGCAGCAAGTTGGCTACT					: 55
4Q2/13_F8 :	.....	C.....				: 55

	60	*	80	*	100	*	
4Q2/10_B8 :	GCGGCACAACCGACGAGTACTGCGCGACGGGTGCCAGTCGGGCCGTGCC						: 110
4Q2/13_F8 :	.....G.....	A.T.					: 110

	120	*	140	*	160	
4Q2/10_B8 :	GGGTGGCGGTGGCGCGCGCGCGCGAGGCGGGAGGCAGTGGCGCGGT					: 165
4Q2/13_F8 :	.....A-----					: 138

	*	180	*	200	*	220	
4Q2/10_B8 :	GGTGTGAAACGTGGCCAGC ATCGTGACCGGCTCCTCTTCAACGGCATCAAGAAC						: 220
4Q2/13_F8 :	.....						: 193

	*	240	*	260	*	
4Q2/10_B8 :	AGGCCGGGAGCGGGTGCAGGGCAAGAACTCTACACCCGGAGCGCGTCTGAG					: 275
4Q2/13_F8 :	.....					: 248

	280	*	300	*	320	*	
4Q2/10_B8 :	CGCCGTCAAGGCGTACCCAGGCTTCGCCATGGCGGTACAGGTGCAGGGCAAG						: 330
4Q2/13_F8 :	.....A.GG.....G.....						: 303

	340	*	360	*	380	
4Q2/10_B8 :	CGCGAGATGCCGCCTCTCGCGCATGTCAGCATGAGACCGGGCATTCTGCT					: 385
4Q2/13_F8 :	.....T.....C.C.....C.....					: 358

	*	400	*	420	*	440	
4Q2/10_B8 :	ACATCAGCGAGATCAGCAAGAGCAACGCCACTGCGACCCGACCAAGAGGCAGTG						: 440
4Q2/13_F8 :	.....						: 413

	*	460	*	480	*	
4Q2/10_B8 :	GCCGTGCGCCCGCGGGCAGAAGTACTACGGCGCGGCCGCTGCAGATCTCGTGG					: 495
4Q2/13_F8 :	.....A.....					: 468

	500	*	520	*	540	*	
4Q2/10_B8 :	AACTACAACGCGCCCGCGGGGAGGGCCATGGCTCGACGGCTCGGGGACC						: 550
4Q2/13_F8 :						: 523

Figure 16b
Novel Compositions with Improved Chitinase Activity
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560 * 580 * 600

4Q2/10_B8 : CCAACAGGGTGGCGCGGGACCCGTGCTGGCGTTCAAGGC GGCGCTTGTTCTG : 605
4Q2/13_F8 :G.....G..... : 578

* 620 * 640 * 660

4Q2/10_B8 : GATGAACAGCGTGCACGGGTGGTGCCGCAGGGTTGGGCCACCACAGGGCC : 660
4Q2/13_F8 :C.T...A.....C.....T..... : 633

* 680 * 700 *

4Q2/10_B8 : ATCAACGGGCCCTCGAGTGCAACGGGAACAACCCGCCAGATGAACGCGCG : 715
4Q2/13_F8 :GG.....A : 688

720 * 740 * 760 *

4Q2/10_B8 : TCGGCTACTACAGGCAGTACTGCCGCCAGCTCGCGTCGACCCAGGGCCAACCT : 770
4Q2/13_F8 :A..... : 743

780 * 800 *

4Q2/10_B8 : CACTTGCTCTAGAGGTGGAAGTCATCATCATCATCATCATCATATTGA : 819
4Q2/13_F8 : : 792

Figure 17
Novel Compositions with Improved Chitinase Activity
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60 * 80 * 100 *
4Q2/10_B8 : GVNVASIVTGSFFNGIKNQAGSGCEGKNFYTRSAFLSAVKAYPGFAHGGSQVQGK : 110
4Q2/13_F8 :TE.E.. : 101

4Q2/10_B8 : REIAAFFAHVTTHEGHFCYISEIISKSNAYCDPTKRQWPCAAGQKYYGRGPLQISW : 165
4Q2/13_F8 :A..... : 156

4Q2/10_B8 : NNYNYPAGRAIGFDGLGDPNRVARDPVLAFKAALWFWMNSVHGVVPQGFGATTRA : 220
4Q2/13_F8 :A.V.....R.M.....I... : 211

* 240 * 260 *
4Q2/10_B8 : INGALECNGNNPAQMNRGYYRQYCRQLGVDPGPNLTCRGSSHHHHHHH- : 272
4Q2/13_F8 :G.....I...K..... : 263

Figure 18a
Novel Compositions with Improved Chitinase Activity
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	*	20	*	40	*	
4P1/2_B5	:	TCGATGCAGAACTGCGGCTGCCAGCAAACGTATGCTGCAGCAAGTTGGCTACT				: 55
4P1/7_H9	:	.....				: 55
4Q1/3_H10	:	.....				: 55
4R2/5_H11	:	.....		T.....		: 55
4R2/1_G10	:	.....		T.....		: 55
4Q1/5_B11	:	.....				: 55
4R2/9_B2	:	.....				: 55

	60	*	80	*	100	*	
4P1/2_B5	:	GCGGCACAACCGACGAGTACTGCGGCGACGGGTGCCAGTCGGGCCGTGCCGCTC					: 110
4P1/7_H9	:					: 110
4Q1/3_H10	:	.....G.....					: 110
4R2/5_H11	:	.....G.....		A....			: 110
4R2/1_G10	:	.....G.....C.....		A....			: 110
4Q1/5_B11	:	.....G.....C.....		C....			: 110
4R2/9_B2	:	.....G.....C.....		C....			: 110

	120	*	140	*	160	
4P1/2_B5	:	GGCGGGCGGCCGGCGCGGGAGGC GG-----		CGGAGGCAGTGGTGGTGCG		: 156
4P1/7_H9	:	.....A..A.T..C.....		.....		: 144
4Q1/3_H10	:	.....T.....C.....		CGGAGGC GG.....C.....		: 165
4R2/5_H11	:	.....A..A.T..C.....		TGG-----		: 144
4R2/1_G10	:	.....A.....C.....		.....		: 141
4Q1/5_B11	:	.....T.....C.....		AGGCGG----.....C.....		: 162
4R2/9_B2	:	.....T.....C.....		AGGCGG----.....		: 162

	*	180	*	200	*	220	
4P1/2_B5	:	AACGTGGCTAGCGTCGTCACCGGCTCCTTCAACGGCATCAAGAACCGAGGCCG					: 211
4P1/7_H9	:	.....					: 199
4Q1/3_H10	:	.....AT..G.....A.G.G.....		G.....			: 220
4R2/5_H11	:	..T.....AT..G.....A.G.G.....					: 199
4R2/1_G10	:	.....A.....		G.....			: 196
4Q1/5_B11	:	.....A.....		G.....			: 217
4R2/9_B2	:	.....		G.....			: 217

	*	240	*	260	*	
4P1/2_B5	:	GGAGCGGGTGCAGGGCAAGAACCTTCTACACCCGGAGCGCGTCTGAGCGCCGT				: 266
4P1/7_H9	:	.....				: 254
4Q1/3_H10	:	.....				: 275
4R2/5_H11	:	.....				: 254
4R2/1_G10	:	.....				: 251
4Q1/5_B11	:	.....				: 272
4R2/9_B2	:				: 272

Figure 18b
Novel Compositions with Improved Chitinase Activity
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	280	*	300	*	320	*
4P1/2_B5	: CAAGGCGTACCCAGGCTTCGCCATGGCGGGTCACAGGTGCAGGGCAAGCGCGAG					:
4P1/7_H9	:					:
4Q1/3_H10	:					:
4R2/5_H11	:		G			:
4R2/1_G10	:		G			:
4Q1/5_B11	:		G			:
4R2/9_B2	:		G			:

	340	*	360	*	380	
4P1/2_B5	: ATTGCCGCCTTCTCGCGCACGCCACGCACGAGACCAGGCAATTCTGCTACATCA					:
4P1/7_H9	: ..C.....				T	:
4Q1/3_H10	: ..C.....					:
4R2/5_H11	:		T			:
4R2/1_G10	: ..C.....		T.T			:
4Q1/5_B11	: ..C.....		T.T			:
4R2/9_B2	: ..C.....		T.T			:

	*	400	*	420	*	440	
4P1/2_B5	: GCGAGATCAACAAGAGCAACGCCACTGCGACCCGACCAAGAGGCAGTGGCCGTG						:
4P1/7_H9	:	G					:
4Q1/3_H10	:						:
4R2/5_H11	:						:
4R2/1_G10	:						:
4Q1/5_B11	: A.....						:
4R2/9_B2	:						:

	*	460	*	480	*	
4P1/2_B5	: CGCCGCAGAAGTACTACGGCGCGGCCGCTGCAGATCTCGTGGAACTAC					:
4P1/7_H9	:					:
4Q1/3_H10	:					:
4R2/5_H11	:					:
4R2/1_G10	:					:
4Q1/5_B11	:	G		T		:
4R2/9_B2	:			T		:

	500	*	520	*	540	*	
4P1/2_B5	: AACTACGGGCCCGGGGAGGGCCATCGGCTCGACGGCTCGGGACCCAAACA						:
4P1/7_H9	:		A			GG..	:
4Q1/3_H10	:					GG..	:
4R2/5_H11	:					GG..	:
4R2/1_G10	:				CC		:
4Q1/5_B11	:					GG..	:
4R2/9_B2	:		T		CC		:

Figure 18c
Novel Compositions with Improved Chitinase Activity
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REPLACEMENT SHEET

	560	*	580	*	600	
4P1/2_B5	: GGGTGGCGCAGGACGCCGTGGTGGCGTTCAAGGCAGCGCTCTGGTTCTGGATGAA					: 596
4P1/7_H9	:G.....					: 584
4Q1/3_H10	:G.....					: 605
4R2/5_H11	:G.....					: 584
4R2/1_G10	:G.....					: 581
4Q1/5_B11	:G.....					: 602
4R2/9_B2	:G.....					: 602

	*	620	*	640	*	660	
4P1/2_B5	: CAACGTGCACCGTGTGATGCCGCAGGGCTTCGGCGCCACCATCAGGGCCATCAAC						: 651
4P1/7_H9	:G.....						: 639
4Q1/3_H10	:G.....						: 660
4R2/5_H11	:G.....						: 639
4R2/1_G10	:G.....						: 636
4Q1/5_B11	:G.....						: 657
4R2/9_B2	:G.....						: 657

	*	680	*	700	*	
4P1/2_B5	: GGCGCGCTCGAGTGCACGGGAACAACCCGCCAGATGAACGCGCGCGTCGGCT					: 706
4P1/7_H9	:A.....					: 694
4Q1/3_H10	:A.....					: 715
4R2/5_H11	:C.....G.....					: 694
4R2/1_G10	:A.....					: 691
4Q1/5_B11	:A.....					: 712
4R2/9_B2	:C.....G.....					: 712

	720	*	740	*	760	*	
4P1/2_B5	: ACTACAAGCAGTACTGCCGCCAGCTGGCGTCGACCCAGGGCCAACCTCACTTG						: 761
4P1/7_H9	:G.....						: 749
4Q1/3_H10	:G.....						: 770
4R2/5_H11	:G.....						: 749
4R2/1_G10	:G.....						: 746
4Q1/5_B11	:G.....						: 767
4R2/9_B2	:G.....						: 767

	780	*	800	*	
4P1/2_B5	: CTCTAGAGGTGGAAGTCATCATCATCATCATCATCATATTGA				: 804
4P1/7_H9	:G.....				: 792
4Q1/3_H10	:G.....				: 813
4R2/5_H11	:G.....				: 792
4R2/1_G10	:G.....				: 789
4Q1/5_B11	:G.....				: 810
4R2/9_B2	:G.....				: 810

Figure 19
Novel Compositions with Improved Chitinase Activity
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REPLACEMENT SHEET

	*	20	*	40	*
4P1/2_B5	:	SMQNCGCQPNVCCSKFGYCGTTDEYCGDGCQSGPCRSGGGGGGGGGGG---SGGA			: 52
4R2/1_G10	:	.....A.....H.....S.....-----.			: 47
4R2/9_B2	:	.....P.....GG-.....			: 54
4P1/7_H9	:	.....SS.....-----.			: 48
4R2/5_H11	:	.....H.....SS.....-----.			: 48
4Q1/3_H10	:	.....GGG.....			: 55
4Q1/5_B11	:	.....P.....GG-.....			: 54

	60	*	80	*	100	*
4P1/2_B5	:	NVASVVTGSFFNGIKNQAGSGCEGKNFYTRSAFLSAVKAYPGFAHGGSQVQGKRE			: 107	
4R2/1_G10	:	.....D.....S.....			: 102
4R2/9_B2	:	.....S.....			: 109
4P1/7_H9	:			: 103	
4R2/5_H11	:	...N...DA.....			: 103	
4Q1/3_H10	:	...N...DA.....S.....			: 110	
4Q1/5_B11	:	.....D.....S.....			: 109

	120	*	140	*	160	*
4P1/2_B5	:	IAAFFAHATHETGHFCYISEINKSNAYCDPTKRQWPCAAGQKYYGRGPLQISWNY			: 162	
4R2/1_G10	:	.....V.....			: 157
4R2/9_B2	:	.....V.....			: 164
4P1/7_H9	:	.....S.....			: 158
4R2/5_H11	:			: 158	
4Q1/3_H10	:			: 165	
4Q1/5_B11	:	.....V.....N.....			: 164

	*	180	*	200	*	220	*
4P1/2_B5	:	NYGPAGRAIGFDGLGDPNRVAQDAVVAFKAAWFWMNNVHRVMPQGFGATIRAIN			: 217		
4R2/1_G10	:	.....A.....			: 212	
4R2/9_B2	:	.....A.....			: 219	
4P1/7_H9	:	.....D.....G...R.....			: 213	
4R2/5_H11	:	.....G...R.....			: 213	
4Q1/3_H10	:	.....G...R.....			: 220	
4Q1/5_B11	:	.....G...R.....			: 219	

	*	240	*	260	*
4P1/2_B5	:	GALECDGNNAQMNRARVGYYKQYCRQLGVDPGPNLTCRGGSHHHHHHH-			: 267
4R2/1_G10	:	.....-			: 262
4R2/9_B2	:	.....G.....-			: 269
4P1/7_H9	:	.....-			: 263
4R2/5_H11	:	.....G.....-			: 263
4Q1/3_H10	:	.....-			: 270
4Q1/5_B11	:	.....-			: 269